

Reference No. 4405006

Service No. 451042

Date of Dispatch: December 7, 2004

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**NOTIFICATION OF REASON FOR REFUSAL**

Patent Application No. 2001-038174

Dated: December 3, 2004

Patent Office Examiner: Tadashi Kawahara

Attorney for Applicant: Mr. Yukio Takanashi

Applicable Law: Art. 29, Para. 2 and Art. 36

The above-identified application is recognized to be refusible for the undermentioned reason. If the applicant has any refuting opinion against the reason, he is required to submit a written opinion within 3 month(s) counting from the Date of Dispatch of this Notification.

**REASON**

(Reason 1)

The invention as set forth in undermentioned claims of this application is unpatentable under the provision of Article 29, Paragraph 2 of the Patent Law, because it is deemed one which could easily have been made by a person with ordinary skill in the field of art, to which the invention belongs, prior to the filing of this application, on the basis of the invention(s) which is/are described in the following distributed publication(s) or made available to the public through electric telecommunication lines in Japan or elsewhere prior to the filing of this application.

**Note**

As to the invention according to claims 1-13:  
Cited references 1-12

**Remarks**

In an optical system such as an optical scanning and projection optical system provided with the diffraction optical element, it is technical common sense for the skilled in the art that the unnecessary diffracted light, such as high-order diffracted light generated at the diffracting optical element, causes the stray light such as the flare

(see, e.g., the cited references 3-7).

Further, in an optical scanning apparatus, in order to eliminate the stray light such as flare or ghost, it is also well known matter prior to the filing of this application to dispose a slit (edge) member for restricting the optical path only in the sub-scanning direction on the optical path between the optical system such as imaging means and the surface to be scanned so that only the light beam to be imaged on the surface to be scanned passes through, or to dispose a reflecting member for reflecting only the light beam to be imaged on the surface to be scanned on the optical path between the optical system such as imaging means and the surface to be scanned (see the references 8-11 as to the slit (edge) member, and see the reference 12 as to the reflecting member).

Further, in a scanning optical apparatus, as described in the cited references 1 and 2, having incident optical means for causing at least one light beam emitted from light source made incident on deflecting means and imaging means for imaging at least one light beam reflected and deflected by the deflecting means on the surface to be scanned in which the imaging means is provided with a diffracting optical element for diffracting the light beam by a diffracting surface disposed on the emitting surface thereof, according to the technical common sense for the skilled in the art, it is apparent matter for the skilled in the art that the stray light caused by the unnecessary diffracted light such as high-order diffracted light generated at the diffracting optical element needs to be considered. Therefore, by adopting the above-described well known technique to eliminate the stray light, it is readily performed for the skilled in the art to adopt a configuration, according to claim 1, to dispose the restricting means for restricting the light beam diameter of the unnecessary diffracted light in the sub-scanning direction on the optical path between the diffracting surface and the surface to be scanned where the unnecessary diffracted light is different from the light beam to be imaged on the surface to be scanned in their diffraction orders and the scanning is performed with the unnecessary diffracted light on the surface to be scanned in the main scanning direction among the diffracted light beams diffracted by the diffracting surface, by means of the configuration to dispose a slit (edge) member for restricting the light path only in the sub-scanning direction on the optical path between the diffracting surface of the imaging means and the surface to be scanned or to dispose a reflecting surface for reflecting only the light beam to be imaged on the surface to be scanned on the optical path between the diffracting surface of the imaging means and the surface to be scanned so that only the light beam to be imaged on the surface to be scanned passes through.

In addition, it is well known used configuration prior to the filing of this application to dispose a slit member for restricting the beam width or passing width in the sub-

scanning direction between the imaging means and the surface to be scanned or to dispose a reflecting member elongate in the main scanning direction having a predetermined narrow width in the sub-scanning direction. Therefore, it is readily performed by the skilled in the art to adopt a substantially same configuration as the invention according to claim 1 by merely adopting the well known configuration to the prior art disclosed in the cited references 1 and 2.

Furthermore, it is readily performed by the skilled in the art to configure the slit member by the incidence window or the emitting window disposed on a casing supporting a configuration constituting the scanning optical apparatus, which is well known prior to the filing of this application.

The cited references 1 and 2 disclose that the diffraction order of the light beam to be imaged on the surface to be scanned is set to 1. Further, it is apparent for the skilled in the art that the unnecessary diffracted light in various orders such as the sixth-order diffracted light can be generated in a diffracting optical element, or the light beams of the various unnecessary diffracted light such as sixth-order diffracted light is at least restricted more or less by the slit (edge) member or a reflecting member for passing or reflecting only the light beam to be imaged on the surface to be scanned.

Moreover, the skilled in the art can properly specify the scanning width of the unnecessary diffracted light and the width of the slit member and the reflecting member in the sub-scanning direction.

In addition, the cited reference 2 discloses to configure the base surface of the diffracting surface to be a flat surface.

(List of cited references)

Reference 1: Japanese Patent Application Laid-Open No. 2000-002847

(e.g., Fig. 1, as to the condition)

Reference 2: Japanese Patent Application Laid-Open No. H11-337853

(e.g., Fig. 1, as to the condition)

Reference 3: Japanese Patent Application Laid-Open No. H11-084118

(e.g., paragraph [0007])

Reference 4: Japanese Patent Application Laid-Open No. H11-271655

(e.g., Figs. 5-7, paragraph [0040])

Reference 5: Japanese Patent Application Laid-Open No. H06-230309

(e.g., Fig. 3, paragraphs [0026] and [0048])

Reference 6: Japanese Patent Application Laid-Open No. H11-307443

- (e.g., paragraphs [0007] and [0008])  
Reference 7: Japanese Patent Application Laid-Open No. H04-212119  
(e.g., Figs. 1, 11, and 12)  
Reference 8: Japanese Patent Application Laid-Open No. S51-120737  
(e.g., Figs. 2-4)  
Reference 9: Japanese Patent Application Laid-Open No. H10-325934  
(e.g., Figs.)  
Reference 10: Japanese Patent Application Laid-Open No. S62-182709  
(e.g., Figs. 4 and 5, and line 11 of right-top column to line 13 of left-bottom column in page 4)  
Reference 11: Japanese Patent Application Laid-Open No. H07-287180  
(e.g., paragraphs [0003] and [0015], Fig. 1)  
Reference 12: Japanese Patent Application Laid-Open No. S63-273823  
(e.g., Fig. 6, and lines 11 to 17 of left-top column in page 8)

(Reason 2)

Description of claims of this application doesn't satisfy the requirements defined by the provision of Article 36, Paragraph 4, and Paragraph 6 (i) and (ii) of the Patent Law as described below.

#### Note

1. In the description of claim 1, it is impossible to clearly understand what the terms "unnecessary diffracted light" and "the unnecessary diffracted light which is different from the light beam to be imaged on the surface to be scanned in their diffraction orders and with which the scanning is performed on the surface to be scanned in the main scanning direction" mean. (It is not clear that which it specifies, a diffracted light in a specific order or entire diffracted lights in all generated orders including transmitted and reflected lights. Further, it is not clear which the wording "the unnecessary diffracted light which is different from the light beam to be imaged on the surface to be scanned in their diffraction orders and with which the scanning is performed on the surface to be scanned in the main scanning direction" specifies, the unnecessary diffracted light generated under a special condition for a diffracted light in a specific order or the unnecessary diffracted light generated under all conditions for all generated diffracted light.) Therefore, it is impossible to clearly understand these definitions and their range.

Consequently, it is also impossible to clearly understand the meaning of "restricting means for restricting the light

beam diameter of the unnecessary diffracted light in the sub-scanning direction".

2. It is impossible to clearly understand the meaning of "light beam diameter of the unnecessary diffracted light in the sub-scanning direction" described in claim 2.
3. It is impossible to clearly understand which the wording "the restricting means is configured by a slit member disposed substantially parallel to the main scanning direction" in claim 3 means, one edge being disposed substantially parallel to the main scanning direction or two edges being disposed substantially parallel to the main scanning direction.
4. It is impossible to clearly understand the terms "unnecessary diffracted light", "the stray light", and "scanning width of the stray light of the unnecessary diffracted light" in claim 7.

Further, it is described in claim 7 that "the scanning width of the unnecessary diffracted light satisfies the following conditional expression,  $L_m/L_o < 0.8$ , where  $L_m$  represents the scanning width of the stray light of the unnecessary diffracted light, and  $L_o$  represents the effective scanning width". Since a plurality of high-order (transmitted or reflected) diffracted lights and various lights generated under various conditions are conceivable as the unnecessary diffracted light, it is impossible to clearly understand the configuration satisfying the scanning width,  $L_m/L_o < 0.8$ , for these unnecessary diffracted light.

Therefore, it is impossible to clearly understand the invention according to claim 7, further, it is also impossible to clearly find the correspondence between the matter described in claim 7 and the description of the specification, and to clearly understand the technical meaning according to claim 7.

5. In the description of claim 8, according to the expression in claim 8, the unnecessary diffracted light is defined as four diffracted lights of fourth-, fifth-, sixth-, and seventh-order when the order of the diffracted light beam to be imaged on the surface to be scanned is assumed to be 1 ( $n=1$ ). However, in the detailed description of the invention in the specification, it is only specifically disclosed that the diffracted light beam diffracted again as a first-order diffracted light, which is generated when reflected and diffracted light ( $m=6$ ) is reflected to be again incident on the diffracting element. Therefore, it is hardly possible to clearly understand how the unnecessary diffracted lights of fourth-, fifth-, sixth-, and seventh-order are made incident on the surface to be scanned; under what a condition; and how to and how much restrict the light beam width of the unnecessary diffracted light in the sub-scanning direction, when assuming and

defining the diffracted lights ( $m=4, 5, \text{ and } 7$ ) in addition to the diffracted light ( $m=6$ ) as the unnecessary diffracted lights (the other cases, such as a case where the unnecessary diffracted light is defined by diffracted lights of eighth- to fourteenth-order when using second-order diffracted light ( $n=2$ ), are same as above).

Therefore, the invention according to claim 8 is not clearly and sufficiently described so as the skilled in the art to implement the invention.

Furthermore, in claim 8, although it is described that "order of the light beam to be imaged on the surface to be scanned is  $n$ ", the wording "order of the light beam" is not technically clearly defined.

6. In the description of claim 9, it is hardly possible to clearly understand how to define and specify "the size of the stray light of the unnecessary diffracted light in the sub-scanning direction at the position of the restricting means" and "the scanning width of the stray light of the unnecessary diffracted light". Therefore, it is hardly possible to clearly understand these matters.

Further, it is hardly possible to clearly understand the contents of the explanation described in detailed description of the invention in paragraph [0052].

Therefore, it is impossible to clearly understand the technical meaning of the invention according to claim 9.

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#### Record of search of the Prior Arts

Technical Field of Search: IPC 7<sup>th</sup> Edition  
G02B 26/10

Prior Arts

This record of search of the prior art does not constitute Reason for Refusal.

拒絶理由通知書

|          |               |           |
|----------|---------------|-----------|
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| 特許庁審査官   | 河原 正          | 9017 2X00 |
| 特許出願人代理人 | 高梨 幸雄 様       |           |
| 適用条文     | 第29条第2項、第36条  |           |

この出願は、次の理由によって拒絶をすべきものである。これについて意見があれば、この通知書の発送の日から60日以内に意見書を提出して下さい。

理 由

(理由1)

この出願の下記の請求項に係る発明は、その出願前日本国内又は外国において頒布された下記の特許文献に記載された発明又は電気通信回線を通じて公衆に利用可能となった発明に基いて、その出願前にその発明の属する技術の分野における通常の知識を有する者が容易に発明をすることができたものであるから、特許法第29条第2項の規定により特許を受けることができない。

記

・請求項1-13に係る発明に対して：特許文献1-12

備考

回折光学素子を備えた光走査・投影光学系等の光学系において、回折光学素子において発生する高次回折光等の不要回折光がフレア等の迷光となることは、当業者にとって技術常識である（例えば、特許文献3-7等を参照。）。

また、光走査装置において、フレアやゴースト等の迷光を除去するために、被走査面上に結像される光束のみが通過するように、光路を副走査方向にのみ制限するスリット（エッジ）部材を、結像手段等の光学系と被走査面との間の光路中に設けることや、被走査面上に結像される光束のみを反射する反射部材を結像手段等の光学系と被走査面との間の光路中に設けることも、本出願前に周知の技術である（スリット（エッジ）部材については、特許文献8-11を、反射部材については、特許文献12を参照。）。

そして、刊行物 1, 2 に記載されたような、光源手段から出射された少なくとも 1 つの光束を偏向手段に入射させる入射光学手段と偏向手段で反射偏向された少なくとも 1 つの光束を被走査面上に結像させる結像手段とを有する走査光学装置であって、結像手段は、出射面に設けた回折面によって光束を回折する回折光学素子を備えたものにおいて、上記の当業者の技術常識によれば、回折光学素子において発生する高次回折光等の不要回折光を原因とする迷光を考慮する必要があることは、当業者にとって自明のことであり、上記の周知の迷光を除去する技術を採用して、被走査面上に結像される光束のみが通過するように、光路を副走査方向にのみ制限するスリット（エッジ）部材を、結像手段における回折面と被走査面との間の光路中に設けた構成や、被走査面上に結像される光束のみを反射する反射部材を結像手段における回折面と被走査面との間の光路中に設けた構成として、請求項 1 における、回折面からの回折光のうち、被走査面上に結像される光束とは回折次数が異なり且つ被走査面上で主走査方向に走査される不要回折光の副走査方向の光束径を制限する制限手段を回折面と被走査面との間の光路中に設けた構成とすることは、当業者であれば容易になし得ることである。

また、そもそも、結像手段と被走査面との間に、副走査方向のビーム幅・通過幅を制限するスリット部材や、副走査方向に所定の細い幅を持った主走査方向に細長い反射部材を配することは、本出願前に周知の慣用されている構成であって、刊行物 1, 2 に記載された発明に、単に、これらの周知の構成を採用して、請求項 1 に係る発明と実質的に同じ構成とすることは、当業者であれば容易になし得ることである。

また、スリット部材を、本出願前に周知である、走査光学装置を形成する構成を保持するケーシングに設けられた入射窓や出射窓により構成することは、当業者であれば適宜になし得ることである。

また、被走査面上に結像される光束の回折次数を 1 とすることは、刊行物 1, 2 に記載されており、さらに、回折光学素子において、6 次回折光など様々な次数の不要回折光が発生し得ることや、被走査面上に結像される光束のみが通過・反射するようなスリット（エッジ）部材・反射部材により、これらの 6 次回折光などの様々な不要回折光の光束が、程度の差はあるにしても、少なくとも制限されることも、当業者にとって自明である。

また、不要回折光の走査幅や、スリット部材・反射部材の副走査方向の幅は、当業者であれば適宜に設定できることである。

また、刊行物 2 には、回折面のベース面を平面形状とすることも記載されている。



## (刊行物一覧)

- 刊行物1:特開2000-002847号公報(図1等。前提について、)  
刊行物2:特開平11-337853号公報(図1等。前提について)  
刊行物3:特開平11-084118号公報(【0007】欄等)  
刊行物4:特開平11-271655号公報(図5-7、【0040】欄等)  
刊行物5:特開平06-230309号公報  
(図3、【0026】、【0048】欄等)  
刊行物6:特開平11-307443号公報  
(【0007】、【0008】欄等)  
刊行物7:特開平04-212119号公報(図1、図11、図12等)  
刊行物8:特開昭51-120737号公報(図2-4等)  
刊行物9:特開平10-325934号公報(図面等)  
刊行物10:特開昭62-182709号公報  
(図4、図5、4頁右上欄11行-左下欄13行等)  
刊行物11:特開平07-287180号公報  
(【0003】、【0015】、図1等)  
刊行物12:特開昭63-273823号公報  
(図6、8頁左上欄11-17行等)

## (理由2)

この出願は、明細書又は図面の記載が下記の点で、特許法第36条第4項、第6項第1号、第2号に規定する要件を満たしていない。

## 記

イ. 請求項1の記載において、「不要回折光」及び「被走査面上に結像される光束とは回折次数が異なり且つ被走査面上で主走査方向に走査される不要回折光」がどのようなものであるのか明確に把握できず(ある特定の次数の回折光を指すのか、それとも、透過・反射を含め発生する全ての次数の回折光を指すのか明確でない。また、「被走査面上に結像される光束とは回折次数が異なり且つ被走査面上で主走査方向に走査される不要回折光」とは、特定の次数の回折光の特定の条件下で発生する不要回折光を指すのか、また、発生する全ての回折光・全ての条件下で発生する不要回折光を指すのか明確でない。)、これらの定義・範囲について明確に把握することができない。

また、その結果、「不要回折光の副走査方向の光束径を制限する制限手段」についても明確に把握することができない。

ロ. 請求項2に記載された「前記不要回折光の副走査方向の光束径」について明確に把握することができない。

ハ. 請求項3の「前記制限手段は主走査方向に沿って略平行に配置されたスリット部材により形成されている」という記載において、1つのエッジが主走査方向に沿って略平行に配置されているのか、又は、2つのエッジが主走査方向に沿って略平行に配置されているのか、明確に把握することができない。

ニ. 請求項7に記載された、「不用回折光」、「迷光」、「不要回折光の迷光の走査幅」について、明確に把握することができない。

また、「前記不要回折光の走査幅は $L_m/L_o < 0.8$ （但し、 $L_m$ ：不要回折光の迷光の走査幅  $L_o$ ：有効走査幅）なる条件を満足する」旨の記載があるが、不要回折光としては、複数の高次（透過・反射）回折光、かつ、様々な条件によって発生する多くのものが考えられ、これらの不要回折光に対して、 $L_m/L_o < 0.8$ の走査幅を満足させるための構成について、明確に把握することができない。

よって、請求項7に係る発明を明確に把握することができず、また、請求項7に記載された事項と発明の詳細な説明との対応や、請求項7に係る発明の技術上の意義について明確に把握することができない。

ホ. 請求項8の記載において、被走査面上に結像される回折光束の次数を1（ $n=1$ ）とした時、請求項8に記載された式によれば、不要回折光は、次数が4, 5, 6, 7の4つ回折光により定義されることとなるが、発明の詳細な説明においては、 $m=6$ の反射回折光が反射されて再度回折光子に入射し、1次回折光として再度回折されたものに対してしか具体的に記載されておらず、 $m=6$ の回折光に加えて、 $m=4, 5, 7$ の回折光を、不要回折光として想定・定義した場合に、どのように、これらの次数4, 5, 6, 7の不用回折光が、どのような条件の元に被走査面に入射され、どのように、また、どの程度、これらの不用回折光に対して副走査方向の光束径を制限すればよいのか明確に把握することができない（2次の回折光（ $n=2$ ）を用い、次数8～14の回折光を不要回折光と定義した場合等についても、同様である。）。

よって、請求項8に係る発明について、当業者が実施できる程度に明確かつ十分に説明されていない。

また、請求項8には、「前記被走査面上に結像される光束の次数を $n$ 」とする旨記載されているが、「光束の次数」との記載は技術的に明確でない。

ヘ. 請求項9に記載された「該制限手段の置かれた場所における前記不要回折光

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の迷光の副走査方向の大きさ」、「該不要回折光の迷光の走査幅」が、どのようにして定義され・決まるのか明確に把握することができず、これらの事項について、明確に把握することができない。

また、発明の詳細な説明の【0052】欄に記載された説明の内容を明確に理解することができない。

よって、請求項9に係る発明の技術上の意義を明確に把握することができない。  
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この拒絶理由通知の内容に関するお問い合わせ、または面接のご希望がございましたら、特許庁審査第1部光デバイス 河原 正 (TEL03-3581-1101 内線3255) までご連絡下さい。

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先行技術文献調査結果の記録

・調査した分野     IPC第7版   G02B26/10  
                          DB名

・先行技術文献

この先行技術文献調査結果の記録は、拒絶理由を構成するものではない。